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UNITED STATES DEPARTMENT OF AGRICULTURE

FOREST SERVICE

BRANCH OF RESEARCH

MONTHLY REPORT

OF

DENDROLOGY

FOREST PRODUCTS

FOREST EXPERIMENT STATIONS

FOREST ECONOMICS

GRAZING RESEARCH

April, 1927.



BRANCH OF RESEARCH

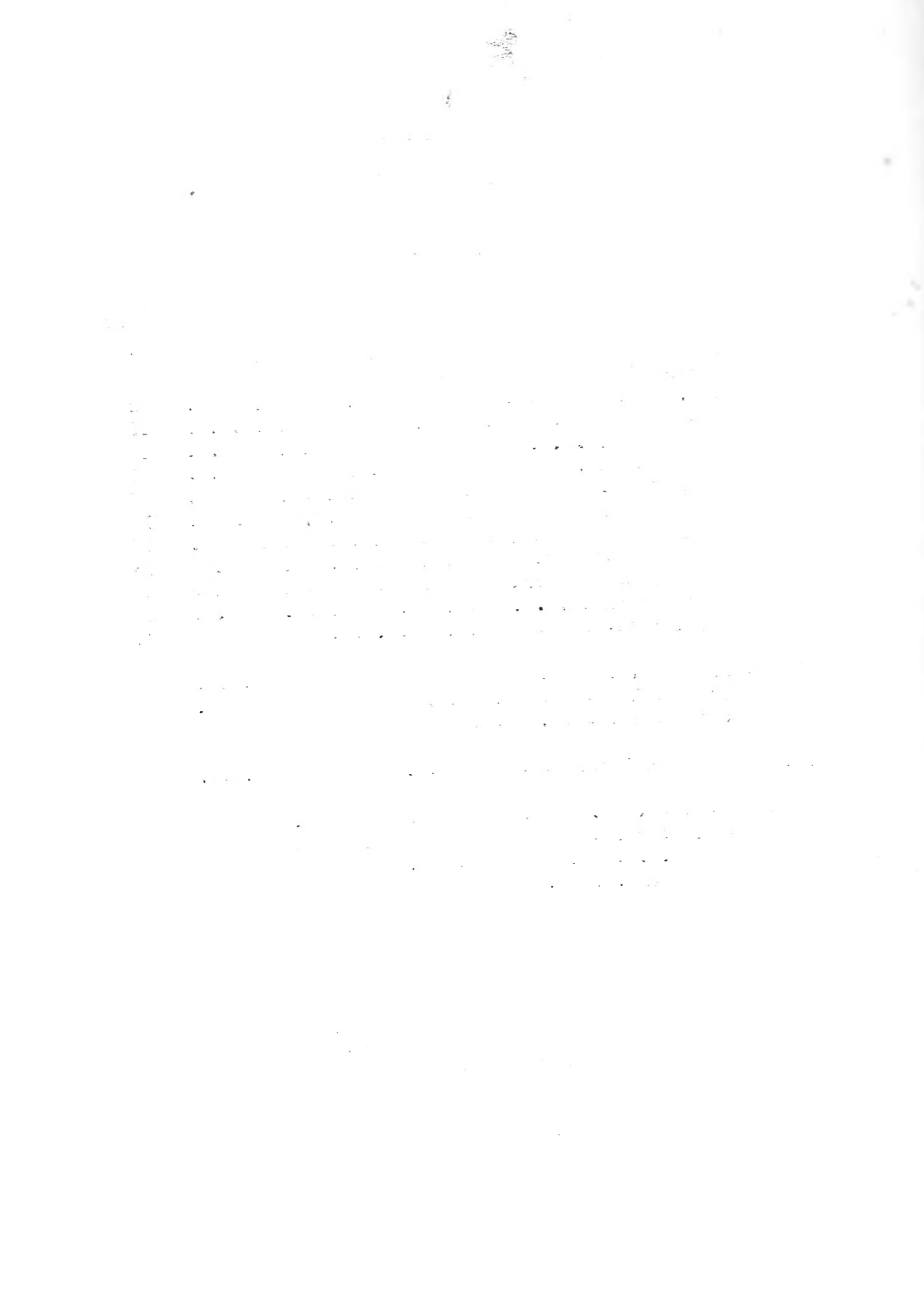
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GEORGE BISHOP SUDWORTH

Mr. George Bishop Sudworth, Dendrologist of the Forest Service, died on May 10 following a heart attack on May 2.

Sudworth's contributions to the Forest Experiment Stations have been many and varied; all of them have been valuable. They range from the discovery of new species of woody plants and the identification of miscellaneous shrubs and trees collected in all sorts of places to advice on the introduction of exotics. Because of his wide knowledge of the flora and of species characteristics, his species range maps have assisted in a better understanding of forest and tree distribution. Keenly interested in the development of arboreta, he has always encouraged the establishment of these wherever possible in order to build up a wider knowledge of forest trees and their possibilities for use in various regions. Sudworth's work on the Federal Horticultural Board is known to the Service only in part, some of its activities being included in these pages. Similarly also, only a few knew of the heavy demand for his services as an advisor to cities and other organizations on the care and attention of shade trees.

Those who have worked with Sudworth and knew him both in the field and office appreciate to the full his many excellent qualities, and his lovable, helpful and kindly nature. His death, together with that of Professor Sargent who also so recently died, leaves dendrology in this country without a real leader, so that from the national standpoint, as well as from that of the Service, his passing will be greatly felt.

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FOREWORD

THE MEANING OF GRADUATE STUDY

By

R. D. Carmichael

Professor of Mathematics, Indiana University.

It was a pleasure to me to accept the invitation tendered through your vice-president to appear before you to-night to speak on "The Meaning of Graduate Study." That it is important to every member of this club to have an adequate conception of this matter is obvious, and I shall not take time to emphasize this fact. I should like to say, however, by way of preliminary, that it is also vital to the university and to the state that both you and all the people of the state should be clear and accurate in your judgment as to the true nature and character of graduate work. On this depends, to a large extent, the success of the university and the measure of service which it may render to its constituency. I hope that the way in which your graduate study is thus vitally related to the university and to the community at large will appear with appropriate emphasis before I have done speaking.

We shall best avoid mutual misunderstanding if I state at the outset the answer which I have in mind to the question, "What is graduate study?"

In the first place it is not a further extension of undergraduate study. It is something different, not merely in degree, but rather in kind. The change from undergraduate to graduate work should be as marked as that from the high school to the university. On passing from the lower to the higher the student goes into a new atmosphere. He finds what is to him a novel attitude and point of view. He begins to look at science and the whole body of knowledge with annointed eyes, and presently the entire structure assumes a new aspect. The student is to be congratulated if this is accompanied by a revolution in his own mind, in his ways of thinking. If these vital inward changes do not take place there is usually little reason for his continuing in graduate work.

All graduate study which properly deserves the name involves research either directly or indirectly. It consists of three parts which are to be developed simultaneously, not successively: (1) One

acquires the detailed and specific knowledge needed for research; (2) one develops the spirit of inquiry and consecration to the task of extending the bounds of knowledge — the spirit which characterizes the man of research; (3) one is inducted into the actual labor of discovery, and thus begins to experience what is perhaps the profoundest pleasure of which our nature is capable. Graduate study which lacks any one of these three elements is essentially deficient; it is not taken into account in our discussion below.

But what is research? What gives to it its central place of importance? What are the materials upon which it feeds? Let us first answer the last question.

The man of research should be free to choose his material where-soever he will. A directing authority would ultimately be fatal to his vitality and destructive of all useful labor. But he must exercise an intelligent choice. Out of the myriads of facts in the universe selection must be made. Some are irrelevant; and these should be discarded. To determine the number of sprigs of grass on the campus or to count the lady-bugs on our planet is not research. These facts—though facts they are—have no permanent character; they do not lead anywhere.

True research consists of any one or more of three kinds of work of equal rank, as follows:

1. Ascertaining new facts of a permanent character or drawing attention to new relations among facts already known. This requires the power to direct attention to things which other people have overlooked, to separate them from the mass of facts in which they are imbedded and to study them first for their own sake and then in relation to other things. The man of research requires the power to see the mosquito on the monument and for the moment to forget the monument for the sake of the mosquito. It is so often the trivial thing which turns out to be important. It is of more concern to us to know the mosquito which holds the power of life and death than to contemplate the battle commemorated by the monument.

2. Deriving the consequences of facts already known. No fact is thoroughly understood until all its consequences are brought into review or the possibility of doing this has been clearly and definitely recognized. Indeed it is only when this has been done that we can be said to have ascertained that the thing is a fact.

3. Developing a body of theoretical doctrine, with or without reference to facts to be accounted for by it. Under this head come such matters as the Mendelian theory of inheritance, the electron theory, the mathematical theory of electricity, projective geometry.

Granting now this definition of research and its fundamental relation to graduate study as outlined above, the question arises as to

when the student should begin the actual work of research. Should it be in the first year? Or, should one await a longer period of preparation in order to be better fitted for it? Probably no other subject requires as much preparation for research as mathematics, because in this the whole body of doctrine is closely connected and interdependent. Many extensive parts of it can be learned in essentially only one order. One may compare it to a tree. The trunk corresponds to the fundamental parts of the subject, the branches are the subdivisions, the remoter twigs are boundaries of present knowledge, and it is here that new truth is principally to be developed. Before one is ready for research he must ascend the trunk, so to speak, and climb out along some vigorous branch to the twigs near its end. All this takes time. And yet, if my short experience is not misleading, this may be tentatively accomplished even in the first year of graduate study. To be sure, such early research is crude; it could hardly be otherwise. Probably one should seldom allow it to see the light of day, so far as publication is concerned. And yet to do such preliminary research is a matter of importance to the student. The power of independent thinking depends first of all on a certain natural aptitude, but it is capable of cultivation. The way to develop this power is to exercise it; and the sooner one begins the better. Too much acquisition and too little discovery undoubtedly benumb the faculty of initiative.

But how is one to get started on research with some promise of successful achievement? Is there a guide who can induct him infallibly into the inner secrets of the creative power? Fortunately or unfortunately, there is no flowered path leading through fields of research, in fact, there is no path at all; every one must blaze out his own trail.

Very few people have sufficient initiative to acquire this ability unaided, or even by the aid of books. The living instructor is usually essential. A certain body of traditional lore is passed on from generation to generation of thinkers and is never reduced to writing. One needs to draw from this source of inspiration. To acquire the power of research one needs to get close to some one who has it, to surprise him in the act of creative thinking and to learn his ways of working. No one is more pleased at this than the thinker himself, for he realizes how hard it is to transmit to others his acquisition, and yet he knows that this is the most important service which he can render. To transmit to others that elusive thing called point of view is at the same time the most important and the most difficult work of the instructor.

I have said that few individuals have sufficient initiative to acquire independently the power of research. On the other hand, I believe that there are many who may develop into successful workers if

they come into intimate relations with a gifted instructor. The extraordinary success of students trained under such a man as Agassiz, for instance, is sufficient proof of this. He kindled a fire of enthusiasm which never burned out.

But why should one wish to acquire this power? The labor involved in its exercise is arduous. The material rewards are not great. The majority of one's contemporaries will not realize the importance of his work. In a little circle only, the inner circle of one's colleagues, will the labor be adequately appreciated. Therefore it is clear that whatever encouragement one has in undertaking such work must be of the higher sort, it must be ideal in its nature. To help you to see the true reasons for doing research is the principal purpose of this discourse.

First of all, what is the meaning of research to the individual who does it? What selfish end may he expect apart from the pleasure of service to his fellows? To do effective research is to know the spirit of mastery, the spirit of mastery where no one else suffers the pang of defeat. It is to develop the sense of superiority of mind over that which is not mind. It is consciously to obey the command to subdue the earth. It is to replenish it with a new creation. It is to make the universe a little fuller and richer by understanding it better.

But more than all this to the individual: he learns what it is to grow. Knowledge obtained otherwise is a sort of accumulation adhering to one outwardly; but when it is attained by independent research it is more like an integral part of one—not merely a possession, but an element of his very being. What I am saying will be made clearer by means of an illustration. A magnet attracts to itself iron filings and holds them indefinitely if they are not forcibly torn away; but however long they are kept in position, they do not become part of the magnet. The knowledge which is gotten by the usual means of acquisition is like these filings; it adheres to one externally. On the other hand, that which is discovered through research is like the material which a plant takes up into itself in the process of growth; it becomes a part of one's essential being. Thus the work of research furnishes a means of self-development which is to be had in no other way. From this point of view to do such work will be a special privilege to one in proportion as he considers his individual development a matter of importance.

There is also a further advantage. When one has learned what it is to see a thing in the flood of light which research throws upon it, all knowledge begins to take a new appearance. The light of research reaches beyond the field in which it was kindled and illuminates the neighboring territory, and finally one's whole body of exact information. It puts one in a new world even while he is amid his old surroundings.

Let us next inquire, What is the meaning of research to the university? The way in which the reputation of the university, and

consequently its power of service, depend on the character and amount of research done by its staff and graduate body is sufficiently objective to be in no danger of escaping your attention; and therefore I shall pass over this matter without further remark. But there is another thing more intimate, more subjective in its nature and more important in its influence, which, by its very closeness to your experience, may fail of appropriate recognition on your part. I refer to the atmosphere, in the academic community, which in large measure is created by your presence and work. This has a pervasive influence of a peculiar kind, and every environment which feels it is vitally affected by it. Every department of the institution is indebted to it for a new tone and fresh vigor. A breath of life is infused into the undergraduate work and an inspiration otherwise unknown is felt. An institution in which pure research is regularly done has an atmosphere of its own which provides a training, even for the undergraduate who is not doing research, which can be secured in no other way. Through its students it contributes to the community at large a vital influence of far-reaching power.

It is obvious that a power of this kind may be utilized with different degrees of effectiveness. I believe that it often lies in part dormant, through the failure of graduate students to develop an appropriate esprit de corps. The great value to each individual of the spirit which pervades the undergraduate body is well known to all of you. A similar advantage may well accrue from the esprit de corps of an organized body of graduate students; and such a club as the present one is effective in contributing to this end. The wide divergence of interests in the various departments makes it harder to find common grounds of association than in the undergraduate work; but the advantages to be obtained are well worth an effort.

Again, let us ask, What is the meaning of research to the larger community of which the university forms a part? What immediate practical ends are attained? What more ideal and far-reaching results are accomplished?

It is one of the paradoxes of human progress that certain practical ends are best served by work which is laid out independently of practical considerations. It is only when one develops truth for the sake of truth itself that one takes sufficient time to forge all the links in the complete chain of theory. If the attainment of a practical end is the purpose in view minor matters which appear irrelevant will be entirely ignored, for the sake of economy of time. But if one is interested primarily in the development of science, no considerations, however unimportant they appear, are left out of account. One's esthetic sense can be properly gratified only by an allcomprehensive investigation of his subject. Consequently the man of research looks at his subject from all points of view and develops a complete theory simply for the sake of his delight in its beauty. When he has finished, it is often found that his discoveries are unexpectedly of great practical importance, sometimes directly and sometimes indirectly. Human progress owes a boundless debt to such agency.

Every science affords examples of the practical value of research to the community at large; but I shall not take time to enumerate any of these.

The chief value of science does not consist in the concrete advantages upon which we can readily lay our hands. All the beautiful results of an ideal nature which are accomplished for the individual researcher also accrue in a greater or less measure to the community at large. A new sense of mastery and adequate grasp of things pervades the general mind when the people realize that the thought of their generation is being developed in part by the men who go in and out before them. There is a feeling as of access to the inner circle of thought which is vivifying in its influence, when we know that those with whom we are associated are of the company of truth discoverers. There is a new tone to the community, and a fresh impetus to its study of the wider problems. Can any community remain the same when it receives a Newton, a Poincare, a James, a vital man of research in any field?

This is a partial statement of the significance of research to the contemporary generation. But its influence reaches beyond the investigator's community or the political unit to which he belongs. It overflows into the whole world of thought, and thus contributes with great effectiveness to a modern movement which by many is believed to mark the beginning of a new era in human history. I refer to the widespread and universal feeling of brotherhood in man, a feeling of common sympathies and common interests which know no geographical or political or racial boundaries. The spirit of research, by its complete independence of everything which separates man from man, binds together elements of the most diverse origin into a common brotherhood in which all feel the same thrill of discovery, the same consecration to the task of extending knowledge, the same incentive to labor for human progress. It is the organizations of men of research which have the most effective international congresses; and the spirit which pervades these meetings is delightful. May we not see in this a forerunner of that day when all men will recognize the extent of their common interests, however diverse the outward forms of their life or their physical surroundings?

Whatever is of present advantage reaches out also to the future; and consequently everything which we have said so far may be applied in partial answer to the question, What is the meaning of research to the future of the human race? But such an answer is indeed partial; there are yet other essential things to add before it is made complete.

If we seek to look into the future we can succeed only by the light which is afforded by the past. Therefore let us examine briefly certain typical instances illustrating the way in which the research of one period has had its full fruition only in succeeding generations. You will pardon me if I draw these principally from the field with which I am best acquainted.

In the great days of ancient Greece her mathematicians were deeply interested in the study of the various curves which may be obtained as the intersections of a circular cone and a plane; and they developed many of the properties which belong to them, especially those of a metric nature. The incentive to this study was the esthetic delight in the body of doctrine itself; no important practical applications of their results were found—none was sought. For many generations this Greek theory of conic sections was transmitted without essential modification and without application to practical matters. Finally, through his acquaintance with this theory, Kepler was led to observe that planetary paths are a special kind of conic section; and his famous three laws of astronomy were discovered and made known. After a further lapse of time, Newton's meditations on Kepler's laws led to his formulation of the theory of gravitation, with the fundamental law of inverse squares as the basis. This in turn furnished the necessary foundation for celestial mechanics, and this magnificent structure was reared by several workers, notable among them being Laplace. If we follow this chain further we shall find that celestial mechanics became the model for an exact science of any class of natural phenomena; and men sought to fashion the whole of mathematical physics after the same plan. It would be hard to overestimate the influence exerted in this way on modern science with all the practical consequences which it has introduced. It is fair to say that we are now reaping some of the practical benefits of the old Greek theory of conic sections, since this theory furnishes one of the essential tools by means of which our present body of science has actually been developed.

Let us take from Greek mathematics another example which illustrates the way in which the value of research is cumulative. Consider Euclid's geometry. It contains an ideal body of doctrine whose form is evidently determined by the author's delight in logical consistency and coherence. It is even yet a model according to which one fashions a careful logical exposition. As is well known, the ordered sequence of its propositions was the guide of the English philosopher Hobbes in constructing his body of philosophical doctrine.

A more recent and totally different kind of example of the value of research is afforded by Mendel's theory of inheritance. About fifty years ago Mendel was engaged in ascertaining the effect produced in various characters by crossing two varieties of peas; for the explanation of the facts which he gathered he offered a theory of inheritance which has since had a remarkable influence on biological thought. And now it appears as if results of profound importance to human progress will arise from the increased knowledge of heredity which Mendel's laws afford.

Examples of this kind might be multiplied indefinitely. The way in which practical consequences of great value have come unexpectedly from research in the past reminds us indeed that specific prediction is useless. When we notice the marvelous rapidity with which scientific facts are now gathered and compare this with the experience of the past, when we see the present magnificent consequences from the relatively meager material for work in the older time, we feel like asking, What is to be the future of research? To what grandeur will it attain? What blessing will it not bring to the human race? One does not dare to assign a limit to its possibility. How far short of the present marvels of science would have been the boldest predictions of the fathers of a hundred years ago!

A work which in the past has proved itself of so profound importance deserves adequate support in the present. Whence is such support to be derived? I wish to answer this question by saying that every unit in the world community should contribute to it. The state of Indiana should sustain her proper share of men of research, and for the further reasons which I am about to state.

That community in which research of the best quality and greatest amount is done will profit most by the total research of the world. Of course those communities which contribute nothing will in the end receive great benefit also. It will be later in coming to them and it will not manifest that vitality which characterizes it in more favored places; but it will come. A sense of fair play and a wish to profit to the fullest extent require, however, that each state shall properly support research in its own borders. Otherwise it becomes a sort of leech drawing its sustenance in part at the expense of the world at large. And no patriotic citizen can ever consent that his state shall be a pensioner on the bounty of others; it must do its part in the work of general progress.

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FOREST EXPERIMENT STATIONS

Washington

General

Messrs. Clapp, Marsh and Betts left the last of the month to attend the annual program conference at Madison, after which Mr. Clapp, in company with Mr. McCarthy, will make a survey of the territory covered by the Ohio-Mississippi Valley Forest Experiment Station to collect data to assist in arriving at the most suitable headquarters location.

During April Haig was the only Station man in Washington. Eyre, who left in March, continued with the field party of the Appalachian Station on the extensive survey work in the Coastal Plain section of Virginia and North Carolina. He returned to Washington early in May.

New Appointments

The work of organizing the new experiment stations has begun and a number of appointments have been made. E. F. McCarthy, of the Appalachian Station, has been selected as Director of the Ohio-Mississippi Valley Forest Experiment Station, and R. D. Forbes, Director of the Southern Forest Experiment Station, will take charge of the new Allegheny Station. Appointed members of these two stations include: A. F. Hough and O. M. Wood, at the Allegheny, and L. F. Kellogg and J. H. Hanley at the Ohio-Mississippi Valley Station. Kellogg this year finished his fifth scholastic year, taking the additional work at Yale. Last summer he transferred from the California District organization to the Appalachian Station, going on leave in the fall. J. H. Hanley is a new member of the Forest Service and is taken from the current junior forester register. Hanley is a Michigan graduate. A. F. Hough, a graduate of Syracuse, like Kellogg, took postgraduate work at Yale this past year. He also has worked for two years in California but on grazing reconnaissance. He likewise spent the summer of 1926 at the Appalachian Station. O. M. Wood comes to Research by transfer from the District 4 organization.

The increase for naval stores work at the Southern Forest Experiment Station provided sufficient funds for an additional junior forester, and Verne L. Harper, a graduate of the University of California, has signified his willingness to help Wyman in the naval stores work. He is being appointed from the current junior forester register as is also A. L. MacKinney. MacKinney a Cornell and Yale graduate is going to the Appalachian Station.

Vacancies at the Lake States Station caused by the loss of Brown and Wackerman in the past year are being filled by the appointment of J. L. Averell and E. L. Mowat. From the current junior forester register the Taxation Inquiry is also appointing a junior forester, Daniel Pingree. Pingree has been working for the past year in the Northeastern region and has spent some time as an assistant on the White Mountain Forest.

Mensuration

The work in mensuration has largely been upon the western white pine yield study. Because of numerous complications caused by the mixture of species and the character of the stands, the data have not yet been completely worked up. By the first of July, Haig expects to have the first composite yield tables ready.

Library

During the month of April 965 books and periodicals were loaned from the library, and 145 members of the Service and others consulted the library in person.

There were 247 books and articles indexed for the catalogue last month.

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NORTHEASTERN FOREST EXPERIMENT STATION

The investigative program for 1927 was finished early in the month. It contains detailed discussions of the major projects, and will be widely distributed as a means of disseminating information to interested individuals and agencies in the region as to progress made, specific results obtained, and plans for future work.

Behre has installed the equipment for the preliminary work on an intensive study of increment and form development on white pine, which will be conducted in cooperation with the Harvard Forest at Petersham, Mass. The march of growth at breast height and at half height above breast height on a number of trees will be followed by means of a steel tape which is read with a vernier to 0.01 inch. In order to insure comparable measurements the tape rests on a number of brass supports fastened to the bark. After the growth has been active for a few weeks, the conditions under which the trees are developing will be modified. Of a series of three codominant trees, two will be released by thinning of the surrounding stand. One of the released trees will then be guyed

with wire to prevent swaying by the wind. The third tree will serve as a check. Of another group of three full-crowned trees, one will be held as a check and the crowns on the other two will be shortened by pruning, one for about $1/3$ of its length, and the other for $2/3$. The effect of these changes upon relative growth at the base and half height should help to throw some light on the mechanical principles of tree growth.

The monotony of computation work and the grind of report writing were interrupted on the afternoon of April 20 by word that a fire had started on Mount Toby Demonstration Forest, where the station has a number of experimental plots in cooperation with the Massachusetts Agricultural College. The station force made a quick get-away, Dana, with the station car and part of the staff, taking the west road to Toby, and arriving in time to augment the crew of students and local residents. The fire was started along the railroad right of way, probably from sparks from a passing locomotive. With plenty of dry grass and leaves, and a lively breeze to fan the flames, the fire spread quickly to the wooded area. However, the fire was quickly brought under control, being held to about five acres. The experimental plots were not damaged, though they are located but a short distance from where the fire originated. Westveld, with the balance of the staff, took the east road to Toby, and ran squarely into another fire just south of the reservation, apparently started by the same cause. This proved the larger of the two fires, and burned over 70 acres before it was brought under control. These fires gave Dana and Stickel a chance to get some humidity readings on going fires.

Stickel has spent most of the month in getting instruments ready for the establishment of the stations for the continuance of the fire weather studies. This will be the third season for the station at Cranberry Lake in the Adirondacks, and the second for the Elk Lake Station in New York, and the Harvard Forest station at Petersham, Mass. In addition, a fourth station will be established at Ashland, Maine, in cooperation with the Maine Forest Service. For making the necessary coefficient corrections with the Livingston atmometer bulbs, Stickel has drawn up small charts which take care of evaporation up to 15 cc., and are for bulbs with coefficient numbers 77 to 84, inclusive. These charts can be conveniently inserted in field note books, and extra blue prints may be obtained by other stations, if desired.

Roy A. Chapman, from the Department of Forestry, University of Minnesota, who has spent a season each at the Pacific Northwest, Southern and Northern Rocky Mountain Experiment Stations, joined the staff as a temporary assistant March 29, and will be assigned to the new fire weather station at Ashland, Maine, as soon as weather conditions permit its establishment.

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APPALACHIAN FOREST EXPERIMENT STATION

General

The field work of the Bent Creek Experimental Forest Survey was completed during the first week in April. The map was made on a scale of sixteen inches to the mile with a contour interval of ten feet, the forest types being shown in color.

Roe made a collection of pollen for shipment to the Eddy Tree Breeding Station at Placerville, Calif. It is the purpose of the Eddy Station to undertake cross pollination experiments in the hope of developing cross-bred varieties of trees with superior growth qualities. Pollen was collected from Virginia pine, shortleaf pine, and pitch pine. The pollen of the Virginia pine was ripe April 18, that of the two other species eleven days later.

The installation of the fire protective system at Bent Creek field laboratory was completed. Water for this system is obtained from two springs, collected in a 900 gallon concrete reservoir and pumped up 70 feet to a storage reservoir from which it can be delivered directly to the fire hose. The springs are capable of furnishing about 125 gallons of water per hour.

R. M. Nelson of the Bureau of Plant Industry reported during the month to take charge of the pathological work of the Station. Nelson will be engaged, during the early part of the year, in completing a study of the rate of decay in chestnut wood. During the month he started several experiments on the Station Forest intended to add to our information concerning checking and other deterioration of chestnut. A number of chestnut trees have been felled in order to obtain a comparison with respect to rapidity of deterioration and checking in felled and standing trees infected with the blight. Chestnut trees will also be girdled at three different periods of the year to determine the effect of time of girdling on rate of deterioration. Observations on chestnut stump sprouts will be made at regular intervals to find the growth they will attain before being killed by the blight.

R. A. St. George has brought his family to Asheville for the summer while he is engaged in the forest insect investigations.

Three members of the Station's staff are taking part in broadcasting a series of forestry talks from the local radio station, WWNC. These talks are being sponsored by the Southern Appalachian Section of the Society of American Foresters.

Loblolly Pine Study

The Coastal Plain extensive survey party consisting of Korstian, Hursh and Eyre started work in the latter part of March on the Lee National Forest. Here they were assisted by Gross, of the Lee, and later joined for a ten day period by Demmon of the Southern Station. While on the Lee the party (cooperating with D-7) assisted Gross in laying out a thinning experiment in loblolly pine. Demmon helped start off the survey work by giving the party the benefit of his wide experience in extensive surveys. Several counties in southeastern Virginia and eastern North Carolina were covered.

Work this spring has been concentrated on the reproduction of the loblolly pine type after cutting. Results to date indicate that when fire is kept out restocking will take place in three to five years after cutting, with as few as six seed trees ten inches d.b.h. and over per acre, and in shorter periods with a larger number of seed trees. Due to the fact that the past month has been one of the driest Aprils in many years in eastern North Carolina, excellent progress has been made in field work, but by the same token, fires have been extremely bad and areas unburned in three to five years are scarce and difficult to find.

Excellent cooperation has been received from lumbermen and foresters, especially in helping to locate suitable areas for study.

While at Burgaw, N. C., two fire damage plots established in 1925 by the Southern Station were reexamined for subsequent mortality. One plot in a mixed stand of loblolly and longleaf pine showed an almost complete loss of loblolly and killing of longleaf up to eleven and twelve inches d.b.h. The other plot in pond pine, which was badly burned in 1925 and in which many trees showed complete browning of leaves at that time, showed remarkable recovery by sprouting from the bole and larger limbs. The mortality was practically negligible, although the rate of growth was retarded on this plot.

Korstian reports very favorably on the new International three-quarter ton truck. It is equipped with a wire screened body which can be securely locked for the protection of equipment and is an ideal rig for extensive surveys.

Nursery Work and Planting

Eight seed beds were furnished by the Champion Fibre Company at its nursery at Canton, N. C., for the propagation of seedlings for experimental planting by the Station. Seed was this year secured from France, Pacific Northwest Forest Experiment Station, Eddy Tree Breeding Station, Placerville, Calif., from the State of Minnesota, from the Couer d'Alene National Forest, the Southwestern Forest Experiment Station, and

locally. In addition to the Canton sowing, several test beds of yellow poplar and southern balsam fir were sown at Bent Creek to test the suitability of the Bent Creek area for nursery purposes. Several experimental plantations were also established on the Experimental Forest at Bent Creek.

North Carolina was this year visited by a very severe frost which not only damaged fruit crops, but killed a considerable percentage of the coniferous seedlings in the Champion Fibre Company's nursery at Willetts, and at Canton. The early foliage along Bent Creek was also killed to a height of about 75 feet above the creek level for a distance of several miles. Some of the species, notably Japanese larch and Douglas fir, planted in test beds at Bent Creek showed damage from this frost.

Oak Study

Work was continued on the computation of oak volume tables after the crew returned from the Bent Creek survey. Some 800 chestnut oak trees have been plotted, planimetered and the volumes figured. Buell has been engaged in computing the oak volume tables. Due to the irregularity of form of oak trees it was found necessary to compute cubic volume tables by plotting the volumes directly upon height and diameter. The resulting cubic volume tables for white oak checked satisfactorily with the basic data.

Forest Insects

Beal, in carrying out his studies of the southern pine bark beetle, has noted a severe mortality on all pupae, adults, and mature larvae, which were over-wintering in the cambium zone and outer bark of pines in the vicinity of Asheville. He attributes this mortality to the severe cold of early January. The only southern pine beetles which seem to have survived the winter are those which were in the egg stage. These were feeding normally in the cages at the Bent Creek Laboratory in the early part of April. Beal believes the sudden and extreme change of weather in January has done a great deal to reduce the liability of a southern pine beetle epidemic this year.

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SOUTHERN FOREST EXPERIMENT STATION

General

The arrival of Assistant Silviculturist Wahlenberg early in the month filled the last vacancy on the Station staff, which is now up to its full quota for the first time since October, 1925. Wahlenberg brings to the Station a wealth of experience obtained during the last several years on forestation projects at the Savenac Nursery in District 1.

Forbes, after finishing a field trip with Kneipp and Ashe, visited the Yale-Penn State Forest School Camp at Urania. In the course of this season's mapping work, the students have prepared for us a topographic map of the Greeley Pasture. This, together with the forest type map, made by last year's class, should be of great assistance in planning future investigative work in the Greeley Pasture.

Demmon, after completing his detail in Washington early in the month, joined Korstian's field party from the Appalachian Station, in the Coastal Plain of Virginia, where they were just getting started on extensive surveys of cutover areas in the loblolly pine region. The ten days he spent with them was devoted to explanations and demonstrations in the field of the methods devised for that kind of survey during the past two years in the South. On his trip back to New Orleans, Demmon stopped off at Asheville long enough to visit the Bent Creek Forest and the Biltmore Plantations.

Pessin prepared a paper on "Mycorrhizas of the Four Southern Pines." He also has compiled a list of the various diseases which have been recorded as occurring on the Southern pines. This will serve as sort of a check list for the use of the Station.

Naval Stores

Wyman, with two student assistants, carried on the regular routine of the naval stores work at Starke, and during the month brought up to date all the office and field records.

Miss Gerry spent a considerable part of the month at Starke in collecting chips to be used in her microscopic studies at Madison. During her stay she outlined with Wyman a plan for an investigation of high and low yielding trees. It is Miss Gerry's belief that a careful investigation of the phloem may throw some light on the yielding capacities of trees. She has already found that there is a greater abundance of starch present in vigorous, high yielding trees than in the poorer ones, and plans to go into this phase of the study in considerable detail some time later.

The Starke Branch is furnishing Mr. B. J. Otte, of the Chemistry Department of the University of Florida, with samples of gum from high and low yielding trees. These will be analysed for per cent of spirits and resene content. This resene is the unsaponifiable inert matter which is objectionable in the manufacture of soap.

Forestation

Wakeley, with the help of Wahlenberg, completed the reexamination of 21,000 seedlings in the Station plantations at Bogalusa, besides making a start on summarizing last year's germination and mortality records.

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CALIFORNIA FOREST EXPERIMENT STATION

General

April continued as another unusual climatic month which delayed some of the field projects. This was a month of many meetings. Kotok delivered two lectures on fire investigation to the Forest School, a talk on the Station's program before the Society of American Foresters, and a talk before the Southern California Conservation Association. Kotok also attended a series of conferences as a member of the training committee of District 5, which has prepared a comprehensive training plan for the District.

A meeting was held with the Forestry faculty on April 21 whereby a definite statement of policy as to coordination of research work by the Station, the School and the administrative organization was drawn up.

Southern California

Kraebel attended a meeting of the Natural History Society of San Diego County and a conference at the Scripps Institute at La Jolla, where a number of notable scientists were present. There is an apparent desire of the Carnegie Institute and the Scripps Institute to coordinate their work with us in southern California. Drs. F. E. and E. S. Clements, in charge of the Carnegie Institute, with Kraebel and Kotok, visited a burn on Devil's Canyon where our first studies in forest influences will probably be undertaken. Both Drs. F. E. and E. S. Clements offered us some valuable advice and promised their assistance should we desire it in the study of the ecological factors involved in the study. Other burns were examined both for the purpose of establishing exposure plots for the study of vegetative succession on different sites and in different cover types.

The nursery work at Devil's Canyon is progressing. The exotics received for arboretum purposes were placed in a holding ground to be closed for a year before outplanting. 2200 Coulter pine 2-0 stock received from Los Angeles County were potted for experimental work next fall. The potted stock was graded and pruned. A comprehensive working plan for the nursery area was initiated and an overhead sprinkling system is now being installed.

Management Studies

Dunning completed his tree classification manuscript which has been submitted to the Office of Management and the District Forester for their review before submission to Washington for publication.

Dunning and Siggins spent most of their field time in examining reproduction strips on the Sierra and a root excavation study on the Stanislaus. In this latter study we are trying to secure the relationship between the soil area occupied by roots, the basal area and crown area of trees of different crown classes in fully stocked stands. An area of pure even-aged yellow pine second growth was selected for study. An Evinrude 2-cylinder fire pump is being used to wash away the soil. This process appears to be feasible where soil is loose and fairly free of rocks. Even the finer roots are preserved. Photographs, sketches, and measurements of the crowns and roots are being made of a vertical section of the stand. Later a larger horizontal section will be excavated. Samples are taken of the various soil layers where roots occur.

Location for some reproduction sample plots was tentatively selected on the Stanislaus where fire lines are being constructed around the Herring Creek sale. It will be possible to use the grader to clear some areas of bear clover and brush, reserving adjoining undisturbed areas as check plots.

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PACIFIC NORTHWEST FOREST EXPERIMENT STATION

Isaac is the only one in the organization who spent much of April in the field, except Simson who was at Wind River the entire month. Isaac got the Douglas fir seed storage germination tests under way and started on the rounds of the reproduction quadrates on various logged-off areas. It is a late season so that germination is more than a month behind what it was last year.

A set of four new growth plots were laid out by Meyer in the early part of April in a fifty year old stand of pure Douglas fir. Two of the plots were fully stocked and the other two were taken purposely to show varieties of abnormal stocking. In the first two plots the ages at breast height of the dominant and codominant trees varied only a year or two, in a third plot the variation was about three years, and in a fourth about five years. This small variation in age classes, which is not great enough to throw a stand out of the even-aged category, still made a decided difference in the character of the stand, the older trees being larger and more limby. This brings the number of plots in the immature Douglas fir type up to 21.

McArdle spent most of the month on the manuscript for the forthcoming bulletin on Douglas fir yields. The tables for this report are now nearly all typed and he expects to complete the manuscript by the first of June.

Westveld completed his report based upon two years field work on slash disposal in the yellow pine region of the Pacific Northwest. This is written with a thought of its publication as a Department bulletin.

District Forester Granger has appointed a committee consisting of Ames, C. J. Buck, Hanzlik, and Munger (chairman) to recommend areas on the National Forests which should be preserved in their virgin condition for scientific purposes. So far only one area, namely, in old-growth Douglas fir, has been definitely set aside for that use.

One afternoon Westveld and Munger went out to the Crown-Willamette Paper Company's nursery a few miles south of Portland. It is devoted exclusively to raising Sitka spruce which is much more difficult than Douglas fir, and an appropriate technic is being developed by Mr. Herman J. Grossman who is in charge. One thousand seed beds have been sown this year which, barring mishaps and damping off, should yield 3,000,000 seedlings. Close to the nursery a few acres of cottonwood planted by the Company 18 years ago are now being logged for paper pulp and they expect a yield of 50 cords per acre.

One of our callers this month was Colonel Graves who was interested to hear all about what we are doing.

One day of the fire conference held by Colonel Greeley and Mr. Headley in Portland with representatives of the western districts was devoted to fire studies, Munger and McArdle giving for the Station a picture of the possibilities for fire studies.

Last month mention was made of the influence that the logging insurance companies are having on bettering fire prevention in the camps. The Logging Insurance Underwriters Association which represents some 50

or 60 companies writing logging-operation insurance has recently gotten out the following "Minimum requirements which must be complied with before insurance can be carried." These 20 requirements are of sufficient interest to merit quoting in full. Many of them are the result of the constant preaching of the Forest Service, justified by experience. The last is of particular interest as being the direct result of fire studies research. These requirements will be even more effective than law in bettering fire precautionary standards.

"1. A fire watchman must be on duty at each donkey in the day time.

2. Night watchman must remain at each "side" at least four hours after closing.

3. Patrolman must follow all trains during dry weather.

4. Area around donkeys must be wet down at least twice daily.

5. Wood-burning donkeys and wood or coal-burning locomotives must be equipped with spark arresters.

6. OIL BURNING LOCOMOTIVES MUST HAVE SPARK ARRESTERS.

7. Smoking must be restricted to certain designated places and notices posted conspicuously, telling exactly where these places are.

8. All snags more than fifteen feet high and within 150 feet of donkeys must be cut.

9. When fuel other than oil is used, ash pans should be inspected frequently.

10. Make adequate clearings around all camp buildings.

11. All debris should be cleared away from bridges.

12. All debris should be cleared away from donkeys.

13. All bridges should be supplied with water barrels and pails.

14. Some one in every operation should be made responsible in all matters pertaining to the fire hazard.

15. Every operation, unless specifically excepted, should have water tank car of not less than 7000 gallons capacity, equipped with steam pump and not less than 700 feet of hose.

16. Every operation, unless specifically excepted, should have at least one portable power pump.
17. A box of fire tools (as provided by law) should be kept at each "side."
18. All oil-burning or gas donkeys should be equipped with a chemical fire extinguisher.
19. All blasting must be done with electric detonators. We are not liable for loss caused by fires started by blasting when fuse is used.
20. All active logging should cease when the relative humidity is below 30%."

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NORTHERN ROCKY MOUNTAIN FOREST EXPERIMENT STATION

Gisborne spent the first half of the month at the Priest River Branch where he was chiefly engaged in starting the complete system of weather measurements necessary during the fire season. Relative humidities as low as 22% were measured early in April. Here he encountered the anomaly of a snow cover up to 2 feet in the timber and a condition of dead grass and weeds on exposed sites dry enough to burn readily when ignited. Although the snow cover is lasting exceptionally late this year, Gisborne feels that no great beneficial effects can be expected from it after June 1.

Junior Forester Day continued on assignment to the Station all through April, compiling weather records under Gisborne's direction. This assistance, and that resulting from earlier assignments, have resulted in the preparation of a series of fire weather cards which is meeting with favorable reception by the administrative organization. For a representative weather station on each of nine fire forests the temperature, humidity and precipitation records have been compiled for the past 15 years to show both the normals and extremes of each of these weather elements by 10-day periods from April 1 to September 30. The summarized data for each 10-day period are put on a 4x6" card which is dated to come to the attention of the Supervisor on the first day of that period. The following is an example of a card of this sort for the period June 1 to 10 covering the Flathead Forest:

FLATHEAD FIRE WEATHER

For the 10-day period June 1 to 10 inc.
Based on the records for Kalispell, from 1912 to 1926, inclusive.

The average rainfall for this period is 0.65 inches.

You have a 50:50 chance of getting 0.38 inches.

" " " 87% " " " 0.01 or more inches

" " " 67% " " " 0.20 " " "

" " " 47% " " " 0.40 " " "

" " " 27% " " " 1.00 " " "

" can expect from 0 to 7 rainy days or an average of 3.7

The average max. temperature for the period is 69° F.

The highest ave. max. is 81°, for this period in 1913.

The lowest " " " 61°, " " " " 1925.

The average 6:00 P.M. relative humidity is 42%.

The highest average 6:00 P.M. " " 56% for this period in 1923.

" lowest " " " " 20% " " " " 1926.

By means of this card the Supervisor's memory of the past weather for this period can be revived and his opinion concerning the weather to be expected during the next 10 days can be based on the actual facts of 15 years of weather records. As the period progresses, the current records can be compared with the normals and extremes shown on the card and an exact statement can be made of the relation of the current weather to that of the past. Appropriate blocks have been provided to hold the current card in a readily observable position on the Supervisor's desk for constant reference. Recently transferred Supervisors who are entirely unfamiliar with the normal weather on their new Forests have been especially pleased with this presentation of weather data. The compilation also has shown the presence of several important peculiarities of the weather not previously suspected by the more experienced men.

Despite the fact that practically the entire staff of the Section of Forest Measurements in Washington, consisting of nine people, has been at Haig's disposal since January 1, the office work on the white pine yield study is still a long way from being finished. The job is a much bigger one than had been expected. Haig states that work has been delayed by incomplete plot tallies of the earlier field work, many of the plots lacking the record of trees in the smaller diameter classes. To meet this situation alignment charts had to be prepared showing percentages of trees above various diameter limits for stands of various average diameters. The office work has also been complicated by the factor of composition in the western white pine type. On the moist sites the usual composition is white pine, hemlock, cedar and often several other species, whereas on the less moist sites the associates are white pine, larch, Douglas fir, white fir and sometimes two or three other species.

A report by Wahlenberg, reviewed during the month, deals with the modification of root systems of nursery stock. This experiment showed that plants with a large portion of their total absorbing root surface between 4 and 8 inches below the ground are the most desirable for highest survival in field planting. Layers of rich and less rich soil of various depths were used to determine how root production might be stimulated in the desired zone. The results indicate that more roots are produced in and just below a rich layer at certain depths than above it. Plants so grown were quite different from those raised in unfertilized and in uniformly fertilized soil. Trees that were field planted from the various plots showed that those with many roots from 4 to 8 inches deep had twice as many survivors as those from the usual plots. Although a commercially practicable method of producing a rich layer is not known, it may be developed administratively in the nursery.

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SOUTHWESTERN FOREST EXPERIMENT STATION

The field season is opening and short field trips are being made as far as road conditions permit. Generally the soil in the yellow pine and upper forests is thoroughly soaked. Above the 8000 foot level snow is still much in evidence. Several thousand yellow pine transplants were set out in the latter part of the month and a few blue spruce still remain to be transplanted. As usual the Experiment Station has cooperated with Flagstaff residents in planting shade trees.

On a recent visit to one of our oldest sample plots on which dense yellow pine reproduction has been obtained after excluding grazing, it was found that wholesale damage was being done by field mice. Mr. Horn, of the Biological Survey, promptly put out poison on the area and expresses confidence in his ability to control the situation.

Mr. Allen, of the Budget Bureau, spent half a day at the Station during the last week of the month. He was shown some of the nursery and planting work, fenced areas demonstrating the effect of grazing upon natural reproduction, and sample plots which are being measured for rate of growth. Mr. Allen manifested a keen interest in all of our work. He was accompanied by Pooler and Calkins of the District Office.

The annual meeting of the Southwestern Division of the American Association for the Advancement of Science was held at Santa Fe April 12-14. The next meeting is to be held in Flagstaff. The Santa Fe meeting was attended by seven or eight Forest officers. Pearson gave three addresses under the following titles:

Scientific Trends in American Forestry.

Some Basic Relations Between Forestry and Grazing.

Physiological Requirements of Some Forest Trees.

Cooperrider presented a paper on the subject "Semi-arid Range Lands of the Southwest - an Economic Asset or Liability to Future Generations."

An address by Dr. Edgar L. Hewett, Director of the School of American Research, on the subject of "Archaeological Reconnaissance in Northern Africa" presented some interesting side lights on our conservation problems. Dr. Hewett stated that the Sahara with its rim country covers an area as large as the United States and as varied in its topography. Only about one-tenth of this area is sand. It is bordered by mountains which have been denuded of forests. This, together with over-grazing, is offered as a possible explanation for the encroachment of sand and desert conditions. Much of the rim country resembles the Navajo reservation in Arizona. In commenting on the paper presented by Cooperrider and Pearson in the Symposium on forestry and grazing Dr. Hewett expressed a keen interest in the conservation work of the Forest Service. He is of the opinion that unless prompt action is taken to arrest deforestation and overgrazing the Southwest is destined to become another Sahara.

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MANUSCRIPTS RECEIVED

NORTHEASTERN

"Observations on Cut-over Pulpwood Lands in the Northeast."

Marinus Westveld. (To Jour. For.)

PACIFIC NORTHWEST

"Forest Fires and the Weather." A. G. Simson (To West Coast Lumberman Annual of May 1, 1927.)

"Slash Disposal in the Yellow Pine Region of the Northwest."

R. H. Westveld.

SOUTHWESTERN

"Slash Disposal in the Western Yellow Pine Type of the Southwest."

A. C. McIntyre.

ROCKY MOUNTAIN

"Forest and Streamflow Experiments at Wagon Wheel Gap, Colorado."
C. G. Bates.

IN PRINT

- Dana, S. T. "Growing Spruce for Pulpwood in the Northeast."
Paper Mill and Wood Pulp News.. March 5, 1927.
- Gisborne, H. T. "The Objectives of Forest Fire Weather Research."
Journal of Forestry. March, 1927.
- Hansen, T. S. "How Nature Overcomes Difficulties." Am. For.
and For. Life, March, 1927.
- Hansen, T. S. "How - What - Why: The Opportunity Offered by the
Cloquet Forest Experiment Station to the Student
of Forestry." Gopher Countryman, March, 1927.
- Hanzlik, E. J. "More About Growth Per Cent." Journal of For-
estry, April, 1927.
- Marshall, Robt. "Influence of Precipitation Cycles on Forestry.
Journal of Forestry, April, 1927.
- Reineke, L. H. "Yield Tables - How Many Plots?" Journal of
Forestry, April, 1927.
- Simson, A. G. "Static as Barometer to Forest Fires." (Tycos-
Rochester, April, 1927.
- Simson, A. G. "The Lumber Industry Discovers Relative Humidity."
Tycos-Rochester, April, 1927.
- Wackerman, A.E. "Forestry Needs a Building." Gopher Countryman,
March, 1927.
- Gisborne, H. T. "Meteorological Factors in the Quartz Creek Forest
Fire." Mo. Wea. Rev., February, 1927.

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FOREST PRODUCTS - DISTRICT ONE

Depreciation Study in Fire-killed White Pine

Plans are now getting under way for the depreciation study in fire-killed white pine scheduled for July of this year. The personnel of the mill-scale crew is being selected and the necessary forms and supplies have been ordered.

During the winter, fire-killed logs from three different camps of the Dalkena Lumber Company logging on the Kaniksu National Forest were separately stamped by company employees. At two of the camps the logs were from timber fire-killed in 1925 but represent two widely separated age classes. At the third camp logs from trees fire-killed in 1926 were stamped. These logs are to be sorted out as the "drive" comes in and stored in a bag boom. Upon the arrival of the mill-scale crew the logs will be run through the mill. The start of the work has been set for July 15, and this date should coincide closely with the completion of the "drive."

In the summer of 1925 the D-1 crew collected detailed mill-scale data, during a two weeks' run, on 3000 green white pine logs at the Dalkena Lumber Company mill. Like data on approximately the same number of fire-killed logs will be secured this July during a two weeks' run at the same mill. Mr. Webb, the D-1 check scaler who scaled the logs in the study of 1925, will fill a like position in this year's organization. A lumber grader with the same ability and trained at the same mill as the one on the crew in 1925 has been selected. The actual collection of data, the data collected, and the method of compilation and comparison will be identical with that used in 1925.

The results on the depreciation in fire-damaged white pine secured by the comparison will be of considerable value both to the Forest Service and the industry. The project is being handled by this office.

Lumber Prices and Movement

<u>Av. Mill-Run Prices</u>	<u>Annual</u> <u>1923</u>	<u>Annual</u> <u>1924</u>	<u>Annual</u> <u>1925</u>	<u>Annual</u> <u>1926</u>	<u>March</u> <u>1927</u>
Idaho White Pine	\$48.85	\$39.20	\$37.37	\$37.77	\$38.84
Pondosa Pine	34.88	28.16	28.02	26.33	25.49
D. Fir and Larch	22.39	19.50	19.33	17.78	18.52
White Fir	24.65	22.62	20.14	19.10	16.81
Spruce	30.67	25.53	24.28	23.73	24.14
	<u>March, 1926</u>			<u>March, 1927</u>	
Cut	151,165 M			116,004 M	
Shipments	152,165 M			141,617 M	

Lumber Census, 1926

The third call was mailed to all delinquents in this District on April 7, which was followed by special letters and personal requests in some cases during the month. At the present time there are only six mills in North Idaho and one Montana mill on the delinquent list for the two States, with 77 completed schedules on hand in this office which will be forwarded to Washington in a few days.

Stumpage Prices, 1926

The compilation of the District's annual stumpage price report was completed during the month. This report contains information on private, state, and Forest Service timber sale transactions, collected through the continuance of the regular stumpage price project in this district and also photostat copies of all data obtained from the special mill stumpage schedules sent out in connection with the 1926 lumber census.

The following figures indicate the comparative number of transactions and volume of stumpage on which returns were obtained by the two different methods of collecting this stumpage price information:

	Number of Transactions	Total Estimate M' b.m.	Cedar Pole No. Pieces
Regular D-1 Follow up	119	324,076	156,355
Special Mill Schedule	96	442,246	34,895

Transfers of ownership in 1926 involved a much smaller volume of privately-owned timber than the transactions recorded during the preceding year. The 1925 report for this District included 170 purchases and sales of standing timber which in the aggregate covered about 1,681,000 M feet of saw timber and 182,000 cedar poles. The special mill stumpage schedule was not used by District One in collecting data for the 1925 report.

Miscellaneous

Mr. W. Gibbons, in Charge of the Office of Forest Products at Portland, stopped off for a week in this District on his way to the annual program conference at Madison during May. Several days were spent in company with Mr. Fullaway going through a number of mills and manufacturing plants in the vicinity of Spokane. During the two-day visit in Missoula, the plans, forms, and objectives in the D-1 mill-scale study of 1925 were reviewed with Mr. Bradner in view of a proposed project of a like kind scheduled for D-6 in the fall.

FOREST PRODUCTS - DISTRICT 6

Washington Wood-using Industries Report

The revised report was brought to completion during the month and submitted to the West Coast Lumberman. Part of the report will appear in the May 1 issue of that journal, the Annual Number. The editor, Mr. Crosby, has agreed to furnish 1,000 reprints.

"Cold Seasoning" Test

Mr. Johnson during the month completed the report on this test. Copies were sent to the cooperators - the Cold Seasoning Society of Cottage Grove, Oregon, the Booth-Kelly Lumber Company, and the West Coast Lumbermen's Association; also to the Forester and the Director of the Forest Products Laboratory.

Census

During the month 374 approved schedules were returned to Washington, making a total of 947 to date. Also 387 third requests were sent out to delinquent companies.

General Survey of Woods Waste in the Douglas Fir Region

Field work started April 4, but due to the backward season considerable time was lost during the first part of the month, so Messrs. Hodgson and Koroleff spent the balance of the time on office work. Mr. Koroleff's resignation from the Forest Service became effective on the 30th of April. Until another man is selected Mr. Johnson will assist on the general survey work.

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FOREST TAXATION INQUIRY

A study of stumpage prices, overrun, and stand per acre for state timber sold during the period 1917-1925 has been completed, covering 200,000,000 board feet, 500,000 cords, and 11,000,000 pieces. The average stumpage values for all species, years, and sales, were 6.99 per thousand board feet, 1.92 per cord, and .06 per piece.

Mr. R. C. Hall has completed his winter's work in Washington, D. C., in stumpage values and returned to Minnesota. The main projects under way in the Minnesota study are:

Tentative classification of land areas in sixteen northern forested counties for agriculture versus forestry.

Estimate of timber on 1,800,000 acres of state lands by correlating existing data.

Study of the finances of sixteen forested counties including annual revenue and expenditures, classified, tax delinquency, public indebtedness, farm mortgages, ditch liens, growth of taxable values and taxes.

Study of school expenditures by Paul Herbert.

Analysis of exempt property, including public land and timber, railroad and city property; of taxable property including town and city, acre property, timber and land.

Study of tax rates on different classes of property, and of delinquent lands.

Study of the assessed and true values of land in seventeen townships situated in four northern counties.

The Minnesota Legislature passed a law recently creating an interim commission to study forest taxation and public finance in the forest areas of the state. A forest tax law was also passed and a law dealing with the problem of delinquent taxes, one providing for the classification of state-owned lands, and one setting aside for forestry all state lands within the Minnesota National Forest.

The Wisconsin co-operative study of forest taxation is well under way and plans are being laid to undertake a study in Michigan this fall.

RANGE RESEARCH

WASHINGTON

Junior Range Examiner Examination

The grading of the examination papers for Junior Range Examiner was completed during the month, several members of the office having helped in the grading. The certificate, which has just been received, shows 16 names. One, over the age limit, is available only for the Indian Service. Mr. Gerald D. Pickford a graduate of Ames Forest School, who was on the District 3 grazing reconnaissance party for two seasons and has served as temporary assistant at the Great Basin Experiment Station last summer and part of this winter, stood first with a grade of 85.68. Eight schools are represented. In addition to Ames there are men from Montana, Colorado Agricultural, Idaho, Yale, Washington State and with a combination of Utah Agricultural and Brigham Young University.

Investigative Programs

Consideration was given the remaining investigative programs in which range research played a part. All of them show steady progress in the investigations and considerable interest in administrative studies by nearly all districts.

Publications and Manuscripts

Forsling's "Development of Better Grazing Practices", and Chapline's "Grazing Research as a Part of National Program" a review of the National Program of Forest Research were published in The Producer for April. A review of Department Bulletin 1405, "Grazing Periods and Forage Production on the National Forests" was also published in the National Wool Grower for March. Several other publications of this same review have been made in livestock and other papers.

Schoeller's "The Cost of a Range Calf" was submitted to The Producer for publication. Chapline's "Salting on Cattle Ranges", a review of Department Circular 379, was submitted to The Cattleman. The supply of Department Circular 379 is already exhausted and there are considerable over one thousand requests which have been received for it. A reprint has already been ordered in sufficient quantity to furnish a very important part of the educational program for better range management. Chapline also completed during the month his part of the Inter-Departmental Bulletin on angora goats and mohair. The Inter-Departmental Committee which is preparing the bulletin will consider the whole manuscript early in May.

A Cooperative Project on Seed Germination and Viability

The project working plan for the cooperative project between the Office of Grazing, Northern District, and the University of Montana for the determination of seed factors in range management has just been received.

The purpose of the investigation is to determine the factors underlying seed production and viability. It is proposed to make germination tests both with porous plates and filter paper and in a germination bed; also to make similar tests on the same samples to determine the effect on the seed of exposure to seasonal conditions, the effect of storage and age of seed on viability, and the effect of light and moisture on germination. The seed is being collected by the members of the Forest Service in District 1, and the germination tests are being made under the direction of Dean T. C. Spaulding of the University of Montana Forest School. Insofar as possible the standards of the American Association of Seed Testers are being followed in making the germination tests.

Burning South African Pastures

The following review is taken from the Journal of Ecology and should be of interest:

"Staples, R. R. "Experiments in Veld Management." Union S. Afr. Dept. Agric. Sci. Bull. 49. 1926.

"The practice of burning vegetation, whether composed of grass or of bushes, is one that is very general throughout South Africa and is undoubtedly a custom of long standing. In spite of its frequency, there has been discussion on many occasions as to the value or otherwise of the practice. The present paper is a preliminary account of experiments undertaken with a view to the settlement of this question in the case of the eastern grass veld. A series of experimental plots were laid down in 1921 at Cedara in Natal on the grass veld, at an altitude of 3800 feet. The rainfall here averages 35-25 inches per annum and falls principally in the summer months, September to March.

"Twelve plots were laid down in a grassland community in which Themeda triandra was the most important species. These plots received various forms of treatment as to burning, grazing, mowing, etc. While the plots were started in 1921, detailed observations commenced two years later, at which time the treatment of some of the plots was altered. Notes are given of the composition and seasonal aspects of the plots in 1923, but no details are supplied of the original composition at the start of the experiment. This is especially unfortunate as the control plot was burnt by lightning in June 1924.

"From the preliminary study the following conclusions are reached:

1. The dominant grass, Themeda triandra, can withstand yearly winter burning if it is not grazed.
2. Burning is not injurious if carried out under suitable conditions, e.g. after rain.
3. Earlier grazing is got from plots periodically burned.
4. Spring or summer burning is harmful to Themeda triandra but does not destroy other climax grasses.
5. Weeds are favoured by burning.
6. Where neither burning nor grazing occurs, Themeda is replaced by Trachypogon plumosus, or with mowing or grazing but no burning by Andropogon and others.

"The quadrat charts made in 1924 of the plots are reproduced. For purposes of comparison it is unfortunate that the forms of shading are not used consistently for the same plants throughout. Several photographs are also given."

(Themeda triandra is a synonym of Anthisteria imberbes as given in Bews' "The grasses and grass lands of South Africa." It is closely related to Andropogon and is considered the most important grass in South Africa.)

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FORAGE INVESTIGATIONS

Routine Plant Procedure

During April, 12 collections, representing 237 plant specimens, were submitted to the Bureau of Plant Industry for the first time for identification. Nineteen collections were reported back to the Districts and collectors. About 45 packages of plants were returned from the Bureau of Plant Industry; these have all been gone over for preliminary listing and, with about eight exceptions, have been preliminary-listed. Sixteen collections are all ready for report to the field except that they await photostatic prints of notes-cards. With these exceptions all plants (save for some check-identified material) determined in the Bureau of Plant Industry have been reported on to the field. Two hundred and eighty-two photostatic prints of notes were submitted to the field in the month, and 397 plants were mounted for the herbarium.

Washington Office Lupines Check-identified by Prof. Smith

Prof. C. Piper Smith, the lupine expert, check-identified during the month 17 selected Oregon lupines from the Washington office herbarium. Our serial no. 12603 from the Minam addition to the Whitman may be the second collection known of Lupinus inyoensis demissus, though the material is not quite typical. Serial no. 21553 from the Wallowa seems to be L. scheuberae Rydb.; if so it is the first record of the occurrence of that species in Oregon, and is not included in Prof. Smith's catalogue of Oregon lupines. Prof. Smith has decided to elaborate his Forest Service herbaria citations. Hereafter, in his work "70" will represent the Forest Service range plant herbarium in Washington, "71" the herbarium of the District Forester at Missoula, and so on up to "78," which will stand for the herbarium in the District office at Juneau, Alaska. Where it is necessary to cite National Forest herbaria that will be done by suffixed lower-cased letters following the District office herbarium number; thus, the Mono Forest is listed last (18th) in the Forest Service Directory and hence will be designated as "75r," "r" being the 18th letter of the alphabet.

Our Part in American Forest Week

On Monday, April 25, at the Rosalie Theater in Washington Miss Jones gave a brief talk on "The Importance of Conservation of the Forests" to children from Randall Junior High, Lincoln-Gittings, Newbell, Cardoza-Oldbell, and Syphax Schools. This talk preceded the showing of the motion picture film, "Trees of Righteousness." On Tuesday, April 26, at the Broadway Theater, the same program was followed with children from Logan, John S. Cook, and Slater-Langston Schools. In both cases the children addressed were from the sixth, seventh, and eighth grades.

Some Botanically Interesting Plant Specimens of the Month

Stanislaus N.F. Mr. Ashbel F. Hough's no. H-40, serial no. 52079, seems to be a first California record for the Suksdorf, or Ovate-leaf Wintergreen (Gaultheria ovatifolia); at least the species is not listed in Jepson's Manual, nor do the ranges, as given in the botanies for the species, include California.

Ochoco N.F. Mr. Douglas C. Ingram's no. B681, serial no. 31384, has very recently been identified by Mr. Tidestrom as Mertensia brevistyla S. Wats. Apparently this species has been known hitherto solely from Utah and western Colorado.

Umpqua N.F. Mr. Ingram's no. 1500, serial no. 51194, Linanthus androsaceus (Benth.) Greene, appears to be the first record of this rather showy little plant from Oregon.

Selloa as a Poisonous Plant

Supervisor Arthur of the Lincoln National Forest has submitted from grazing permittee Rance Turner a half-shrubby plant specimen, very closely resembling the common snakeweed (Gutierrezia) in appearance, which has been identified in the Bureau of Plant Industry as Selloa glutinosa Sprengel (= Gymnosperma corymbosum DC.). Mr. Turner, each season, loses a few head of cattle in a holding pasture and suspects this plant of being poisonous. Dr. Marsh, physiologist in charge of poisonous plant investigations of the Bureau of Animal Industry states that this is the first time that selloa has been reported to him as suspected of being poisonous. In view of the very close relationship of this plant to snakeweed, which Dr. Marsh states is undoubtedly more or less poisonous and sometimes dangerous, it does not seem unlikely that selloa may possess similar properties.

The Latin Name for Christmasberry

We are much pleased to see the revised edition of Mr. Sudworth's Check List. It represents an immense amount of labor and will be invaluable for reference. It is encouraging to see how closely in accord it is with the nomenclature used in the Bureau of Plant Industry.

The Check List name for Christmasberry is Heteromeles arbutifolia (Poiret) Roemer. The Bureau of Plant Industry is using Photinia salicifolia Presl for this beautiful California tree. Heteromeles M. Roemer (1837) appears to be a synonym of the older Photinia Lindley (1821). Moreover, the specific name, arbutifolia (based on Crataegus arbutifolia Aiton (1811), NOT Lamarck (1783) is, it will be noted, homonymous and untenable. It would seem, therefore, that Photinia salicifolia Presl is the oldest tenable name for this species, and that Heteromeles salicifolia (Presl) Abrams, H. arbutifolia (Ait.) M. Roem., and Photinia arbutifolia (Ait.) Lindl. are synonyms of it. The Bureau of Plant Industry rule, by the way, is: "Once a homonym always a synonym." This rule seems to be meeting with pretty general favor in the taxonomic world. Under it, of course, arbutifolia is ruled out of court as the proper specific name for the Christmasberry.

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JORNADA RANGE RESERVE

Range Conditions & Precipitation

Weather conditions for the month have been rather variable. The first part of the month had warm days and nights. The middle of the month had a few cold days and nights which brought the growth of the vegetation to a standstill for a time. The latter half of the month has been warm and favorable to plant growth except for an occasional sand storm.

There has been little precipitation but there is still plenty of moisture about two inches below the surface. Most of the perennial grasses and weeds are making some growth and the range as a whole is in good condition.

Cattle are in very good condition and the prospects for the immediate future appear to be good.

The windmills and pumps have been giving considerable trouble this month as they do not stand up well under the strong winds. Water is becoming scarce where dirt storage tanks have not been replaced by steel ones.

Investigative Work

Computation of the 1926 Quadrat Sheets completed.

Compilation of the 1925 - 26 quadrat data completed.

Numerous odd and routine jobs connected with the field and office have taken up the greater part of the time this month.

Federal Business Association

Canfield attended the meeting of the local Federal Business Association on the 20th of April and acted as secretary in the absence of Mr. Schoeller, who was on leave at that time.

Road Work

Improvement work on the Jornada Road in cooperation with the Dona Ana County Commissioners was started April 9. Dona Ana County furnishes the necessary machinery, gasoline and oil and the Forest Service

pays the wages of a three-man crew. Mr. Wayne Crowder, the County Road Superintendent, donates a part-time supervision of the work. At present about eight miles of grade is completed at a cost of \$196.00.

Visitors

Mr. J. Stokley Ligon of the U. S. Biological Survey assigned to the New Mexico State Fish and Game Department was a visitor at the Jornada April 13 to 16. He was investigating the reported presence of mountain sheep on the reserve. Owing to bad weather conditions Mr. Ligon had little success in locating the sheep.

Personnel

Director Schoeller, on leave in Los Angeles, California, reported back to duty April 21 at the Southwestern Forest Experiment Station. He will return to the Jornada Range Reserve on or about April 28. He also stopped enroute at the Desert Arboretum of the Boyce Thompson Institute for Plant Research at Superior, Arizona, and on the Tonto Forest to consider Mr. Copperrider's Browse Study.

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SANTA RITA RANGE RESERVE

Crook Ranger Meeting

The Crook Ranger Meeting was held at the Reserve from April 5 to 9 inclusive, with the following in attendance: Supervisor Rex King, Assistant Supervisor C. E. Moore, Executive Assistant W. L. Stiles, Technical Assistant E. L. Hamilton and Rangers S. D. Sowell, J. W. Girder, W. E. Wiltbank, C. V. Christensen, H. L. Taylor and R. D. Rowley. Inspector of Grazing D. A. Shoemaker represented the District Office while Assistant Supervisors C. W. McKenzie and W. J. Anderson were present from the Coronado.

The first three days of the meeting were devoted to range management with the bulk of the time being consumed in field trips over the Reserve. Stops were made at different points for the purpose of discussing the various phases of the investigative work and for the purpose of demonstrating the actual application of the principles developed from our work. Mr. Shoemaker conducted a short course in reconnaissance, which gave everyone present an understanding of how reconnaissance data is collected, what it means, and how it is applied. Palatability came in for extended discussion as did also proper utilization with the result that both of these elusive factors should be readily recognized by the Crook personnel, hereafter.

The remaining two days of the meeting were given over to a discussion of matters pertaining to general Forest Administration.

Visitors

Junior Range Examiner W. G. Koogler, in charge of District 3 reconnaissance, was a visitor at the Station on April 22nd, and 23rd. He found most of the vegetation here entirely different from that with which he has worked heretofore. Babe also "thot it was pretty hot down here, but shucks it's cool for this time of year, tho it may get warm later on, and we'll save our sympathy until then."

Inspector of Grazing R. R. Hill spent the last three days of April at the Reserve going over the work, and discussing the final revision of a manuscript covering the investigations here.

Spring Growth

Moisture conditions continued fairly good through the early part of April, though spring growth did not come on as well as had been expected, due to continued low temperatures up to the middle of the month; however, there is ample forage on the Reserve. Browse species are out in full leaf at least after having been set back several times by cold weather.

Condition of Stock

Stock on the Reserve is in excellent condition with the exception of that in Pasture #2 where overstocking resulted in a shortage of feed that is very clearly reflected in the condition of the cattle. Recent sales by Parker brought the following prices: Two and one-half month old calves \$25.00; yearlings \$36.00; cows \$52.00. Weights of these cattle have not yet been secured, since the sale only occurred a few days ago.